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**-- SHIRWO SYSTEM --****(A NEW INTERNAL COMBUSTION POWER SYSTEM)****INTRODUCTION**

This is a research of a new system's design for internal combustion engine with a better fuel's energy utility ,by using more potential powers in this system due to improving and maximising the fuel energy ,then computerising them to increase torque power in a small simple automotive power engine. With economical industrial methods of manufacturing and more advanced practical ways of controlling engine activities for various engine outputs with improvement ways of reducing fuel consumption.

It was a ten year old dream of the inventor to design a powerful internal combustion engine, flexible in operation with its economic fuel consumption and more harmonic in performance ,utilising the computer progress .By this technology .A power engine that could become so close to Man's order to be as a living object.

A new environment-friendly generation of a clever combustion engine may appear, since it depends on those technique and universal physical principals, those used in flying and beyond it i.e. spaceship flying in atmosphere free from earth's gravity; all inside this engine discipline. Of course many diverse scientific researches are needed for developing its fabrications (theoretically) in order to reach the best conclusions for various proposals in implying this system for different kinds of work with best economical commercial productions for each.

This concept contains extensive principles, it needs to be developed scientifically and mathematically in Classified industrial laboratories to conclude the various designs according to the production`s standard requires. It has been more than hundred years since the invention of Otto petrol internal combustion engine had appeared, still used until now to supply automotive power. The fast progress in the world, the financial developments, the economical problems and the increase of pollution on earth, make it necessary to develop a new automotive engine . A new system that could convince the environmentalist organisations and the consumer recent requirements by using advance technology with computer control with better specifications and performance by this system .Thus it apply promoting solutions to future environmental problems with economical in, production and fuel consumption.

It's time to reconsider the way of using the potential energy of Petrol fuel in producing automotive energy for the light power equipment. In away to improve the

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principal of fuel combustion in the engines to be in its maximum useful potential advantage in producing torque power inside a small simple economic machine.

Using the facilities of advanced scientific techniques and the recent progress of computer control systems in most industries.

Wishing to be a very useful system to solve future problems in a better use of Petrol-God's generous gift to Man, the best powerful valuable cheap material; by an efficient ways of utilising automotive energy from it with economical consumption hopefully to be used in the 21<sup>st</sup> century and to be invested by all the world for peace purposes and human progress

**This system's research:**

This a brief configuration contains: description, major changes, design principal (back ground), composition & accessories, engine performance & analysis of potential ways of producing torque power, useful industrial & commercial characteristics, it's various design proposals, drawings contents, drawings(Figs) details and then Claims & abstract.

..... **DESCRIPTION** .....

**S-H-I-R-W-O: ( SPEEDY, HARMONIC-HYDRAULIC, INDEPENDENT-INTENSITY, ROTARY, WHEEL , OPERATING)**

**SYSTEM: A SPECIAL MECHANICAL DISCIPLINE FOR INTERNAL COMBUSTION ENGINE.**

A new compact power engine designed to use the fuel chemical energy in specific relations with additional natural physical forces by using of many dynamic principles computerised by new techniques of this mechanical metal machine to produce better torque output powers.

This is a mechanical engine of internal combustion system, produces torque power from Hydrocarbon combustion energy using any types of gasoline fuel or could use Jet kerosene or gas fuel in this principal; to produce powers from expanding gases volume i.e. pressure of gases that result from fuel fast burning (combustion emission gases) in closet chambers, and transfer these powers to torque movement, using specific but simple components working in one connected system that applies additional potential powers to normal said fuel energy and provides pioneer industrial and commercial characteristics in a compact power engines.

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A practical engineering design that composes types of recent combustion principles, which produce torque power from fuel: piston, rotary and turbine in one compact composite system engine unit.

This system with its mechanical design will use a new way of circular distribution for pistons locations in engine case with the advantages of this locations in the work that apply more potential powers to fuel (additionally) on engine output with other good advantages.

This mechanical system is designed in away to use the fuel chemical energy in high efficient manner and adding to it : almost in-visible powers.

After the instance of fuel combustion . There will be powers that can be agitated due to the physical dynamic principals which are placed to happened inside this discipline . These nature powers that agitate due to dynamic effects on the elements will effect due to this mechanical design .

By utilising the advantages of specific gas characteristic in closed chamber (combustion gases in the chambers) and the ways of chambers placed in the circular zone in this engine . There will be powers that agitated. The aerodynamic energy of the hot exhaust gases of the chambers will be agitated also in a specific way to be used. This engine's discipline will computerised the distribution of these powers to effect all in positive resultant on the same direction -with the fuel mixture combustion power - on torque crank to maximise the output power in the engine for the said fuel .

These physical energies used to be ignored until now .That is because the conventional engines depending only on the visible effect of the direct fuel explosion pressure power inside. Neglecting the physical dynamic energy effect that could happened due to specific movements on the elements ,inside the engine parts movement if they were put in the right way .Since there is no discipline to concentrate these energies to be used positively in these engines.

This is a new way of magnifying the fuel potential chemical combustion energy by existing the dynamic nature physical principals inside the discipline of the engine and using the resultant to increase the engine output for the said fuel. many powers would result due to the discipline of this design .These will be utilised to act all positively on the same target i.e. magnifying fuel combustion power output ,maximising this said energy that used for the same application . It will increase the output and reduce the said fuel consumption.

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### **THE PRINCIPAL OF THIS SYSTEM DESIGN (Back Ground):**

The conventional pistons combustion engines depend on a set of piston cylinders fixed in engine case (chassis) using reciprocated push-arm between pistons and a zek-zak crank shaft connected with them in determined angles by mounting frictional minimising pads, transferring torque depending only on this direct contact principle of dynamic.

This mechanical design are seated up in a discipline to use the direct contact dynamic and also by deliberates and agitates some physical energies, to appear then producing potential positive influenced powers that all will act in the same way with fuel i.e. in applying powers on engine crank.

The positive summation reaction (resultant) of those energies will devolve to act positively on output after fuel combustion occurred inside chamber(s), which could be driven to produce more output power on the crank; as the system's extra physical powers.

This positive resultant power reaction due to the system design (at typical mod) of:

1. Natural elastic characteristic of element (gases, spring or hydraulic device resistant).
2. Natural aerodynamic power of gases by the potential energy of exhaust gases.
3. Natural physical principle of the centrifugal potential power (appears at high speed).

These natural energies appear due to movement effects on elements in this discipline which let new potential energies occur, instantaneously after the occupation of fuel combustion in chamber of (said) fuel then maximising output in this system. The positively reaction of any of these power will be in relation to engine design and speed situations.

The mechanical design of this system would keep a minimum energy loss(from combustion power) inside due to it's simple machinery (recent systems lose rate 20-40% due to their, machinery parts, friction, heat.....etc) which affects on the power-weight relation, thus this system could assume:

**Almost total potential fuel combustion's energy will transfer to torque power.**

Although the speed could be invested in this design in reducing the fuel consumption automatically.

The main target (by the inventor) of this system was in setting separate power units in one engine and the ability of changing any units performance output automatically by easily management from out side; in a small compact engine. The scientific research could conclude from the following description that ,this new spark internal combustion

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system: A system of any piston (or group) can work independently maintaining smooth performance without disturbs engine efficiency, a system utilising the potential physical powers in output and can counter the fuel consumption in increasing speed. This system could be performing as a multi-purpose engine depends on types of works. An engine of economical production by deducting many industrial requirements, reducing the lines of production these mean reducing costs.

The design will provide many good industrial techniques briefly like:

A better engine performance, less fuel consumption, a perfect with flexible or automatic output, a built-in pollution treatment, a devisable design proposals with less industrial requires, economical productions and easy, long duration maintenance and perfect computer control for almost all the engine activities and other things.

#### **MAJOR CHANGES (IN TECHNIQUES):**

The techniques in this principal totally differ from those recent systems, known as: **Otto, Diesel, Wangle** or those with modified DOHC, SOHC or even **Turbine system**. The global change is in the basic design from those internal combustion engine: it is by using wheel(s) inside engine; containing piston's cylinders in a discipline that could transfer fuel energy with additional potential energies into torque power in the engine beside other major changes which would apply good industrial advantages.

A system of various power stroke, one or two or three or more piston power strokes as required(at the same; part-on the crank);at one crank rotation, no energy loss stroke !

A system-using engine with rotating wheel(s) fixed on straight crankshaft!

A system of independent piston performance related to crank shaft or other pistons!

A flexible (elastic characters) piston push-arm to transfer potential energy to torque!

A system using charged (pressured) air-fuel mixture (beyond turbo);in spark engine!

A system combining piston & rotary & turbine techniques in one compact engine!

A system of different cylinder and other type of valves in the discipline and places!

A system that agitates & utilise Physical nature's principals energies in output !

A system using aerodynamic power of exhaust gases to act as turbine output power!

A system that could reverse the, high fuel consumption; due to speed increase!

A system with less transferred combustion energy Loss to torque by its machinery!

A system leads to set an automatic parts performance output unit in one engine!

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**A better fuel combusting in all fuel's situations using elastic flexible space chambers!**

**A system could be used in horizontal or vertical crank (torque shaft); direction!**

**A system treating pollutant in practical ways with a built-in techniques engine!**

**A system of good output, slow or high speed, safe performance in one engine unit!**

**A system cheap less industrial requires and simple maintenance!**

This configuration is theoretically expected, it depends on scientific principles and could be developed and practically concluded. More new extensive characteristic could be reached by the assistance of the specialised automotive laboratories using the available advanced techniques of: the metal alloys, dynamic principals, liquid hydraulic data , information available for composition's elements , the required dimensions with the industrial specifications and assistance of computer processing in design, even in management of control the engine activities and various performances for multi-power output for development of this system.

This new system with it's design principal and its principles included will change the way of transferring the fuel energy to torque power, maximising this energy than before. Using simple applications depending on different mathematical equations from those used in recent internal combustion systems, this system will apply extra value for fuel energy.

The fundamental principal for this system and it's principles, could be developed to be used now as: **a new advanced system**, whenever these facilities available, or a part(s) of its principles could be used now (**i.e. partially used**) in order not to interrupt or influence those recent automotive industries in order to prevent any sudden commercial impact in their productions.

However using any of these principles should be referred to this (research).

**MANY SPECIFIC CHARACTERISTICS WOULD BE INDICATED IN THIS CONFIGURATION.**

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**Compositions as per the typical drawings of : .....**

**1. Out side Case (the engine body chassis) a metal cylindrical or octagonal shape (as in the drawings) with a diameter of 330-380 mm in horizontal-position on crank and approx..length (as drawing) of 550-650 mm with a large cylinder cavity of 301 mm. Contains trenches for seals, tunnels for oil, water and places for valves with special exhaust openings. The industrial requirement may divide it into two parts upper and lower or more. (Det-2 Fig : 2/25 & 3/25, 4/25).**

2. The Crank (as crank shaft) a torque output shaft is a straight solid steel iron, placed on the horizontal centre line of the engine along the Case length and extended more, its diameter 25 mm-50mm ;at the connecting points with the Case by ball bearings, which allow it to rotate only on its centre line. It contains oil tunnel in the centre line ,contains holes for linking oil feeding to rotating parts. Its surface geared (grooved) to interlock trinket with the rotating parts to move all together. (Det-6 Fig : 2/25 & 4/25)

**3. Power wheel units (Energy production units) metal wheels (3 in this drawing) each one is a solid strong light alloy wheel, a diameter of 300 mm and a width of 120 mm with smooth surface(s) strengthen by (anti smashed) alloy, contains (here) two cylindrical hollow (cavity) with opening placed in opposite directions with smooth internal surfaces Bore. The pistons placed in each one. Its diameter (here) 80 mm and length of 120-180 mm depending on the industrial requirement data. Each cavity base with two small oil stores (sumps) one which receives oil by tunnel linked with main supply tunnel (canal) in crank for intake lubrication oil to feed piston arm.**

Other store of outlet oil flow from piston arm to be disposal by other tunnel into wheel side. An opening between these two sumps in the wall between maintains the feeding store in a full situation always. The central grooved hole of the wheels to interlock the connection with Crank (torque output shaft). There are two washers around the crank on the two sides of each wheel for oil lock. There are two trenches in outer circular circumference face of the wheel for fixing a

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pair of side circular gas-oil wheel slider-seals. The number of these wheels depending on the design and output ability of the engine.

The direction of the longitudinal centre line of any piston's cylinder in a wheel differs from the near cylinder of other wheel in a known angle that could be found from dividing  $360^\circ$  by the numbers of total cylinders in a typical engine.

The crank may be trenched according to the wheel numbers for easy assembling that starts with cooling pad and wheels in required angles and ball bearings particularly i.e. all rotating parts to be geared together on the crank, by pressing exactly at its designed places before fixing the crank in its Case position. (Det-3, Fig 2/25 & 5/20)

The manufacturing of power wheels units could be done by costing alloys with trenches, setting drilling, welding tunnels, modified circumference and grinding cylinder bores as these would be the main standard mass production units in any engine design industry line for each proposal.

4. The pistons: each one is of solid metal alloy high resistance light disk, fixed inside the cylinder with 20-35 mm thickness nearly the same cylinder Bore diameter. It contains in grooves the circular seals for gas and oil. There are suitable two middle inside tunnels for lubrication oil inlet and outlet that linked with the build-in pump at push-arm device top end. There are other smaller radial tunnels linked separately with each of these two middle tunnel and piston circular edge to cool piston and to distribute oil to piston wall with Bore surface. A special lubricating seal or two in the oil gap on piston wall to uniform the lubrication of piston circumference with cylinder bore, i.e. between piston and cylinder for good slipping movement. Minimising friction and heat while piston in movement: The piston is connected by wash-bolts with its solid bearing base plate that capping the flexible push-arm. There is a solid steel ring at the top of cylinder Bore fixed in a groove to lock the piston in the cylinder at movement, A suitable curved piston top capping face required (Det.7 -Fig 4/25 & 8/25).

The manufacturing of piston by costing alloy with tunnel, grooves and seals...etc

5. The flexible piston push-arm of metal a pair of stainless steel pipes slipping inside each other (or a couple) fixed vertically on cylinder base inside it. A metal mechanical spring (straight or inclined) around or built-in with the push-arm, used. This method to maintain vertical piston movement. A push-arm design to

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work as resistance of elastic character with the required calculation for each proposal. A hydraulic device (like the shock absorber) working as a flexible elastic resistance system with particular reaction (capacity) depend on type of engine could be connected the piston to the wheel at cylinder base in vertical movement ability only (same that spring or device which used automatic weapons to re-fill, artillery guns etc). (Det - 8, Fig 4/25, 8/25 & 11/25)

6. The piston lubrication pump, is made from pair of sliding pipes each of two small stainless steel pipes slide in each other contain tunnel inside it for oil, consist one way oil valve (check valve) for each inlet; in opposite direction (a valve, using solid small ball locked in a small chamber, an opening with a diameter less than the ball's half spherical shape and other opening of many small hole to let the oil flow at one direction for each position of piston movements) to act as ordinary shaft pump due piston movements (with push-arm). A pump of two opposite direction flow pipe shaft as in the drawing to work also as push-arm device...for example..(Det- 10, Fig 4/25 & 8/25).

7. The cooling & lubrication pads: each one of light alloy with radial trenches, i.e. grooves starting from central pad sump to the edges attached the wheel side-wall, working almost same as a centrifugal circular pump. A diameter a bout the same of wheels, and an opening of oil from central Crank tunnel for feeding to bring oil from the crank to distribute it on wheel walls, cooling them then disposed to the circumference edge then to outside wall Case tunnels. It contains low (or high) part(s)zones at the modified differential smooth edge in certain places against each chamber .For slipping and controlling the mechanism bar timing system of the air and air-fuel mixture valves, for each wheel when rotating with the crank. This is the way of computerising the timing of valves opening against particular chambers, in the right time. It is a simple, easy, brief, oil moisturised and a perfect independent mechanism way across the Case for each wheel unit. (Det- 17, Fig 3/25 & 7/25).

8. The seal masses anti-gases, fixed in the Case: each of metal alloy (or hard anti-heat plastic combination) according to its work which is the anti-gas seal attached the wheel wide circumference face. It could be in any size but at the same width of each wheel's circumference face. It is attached with the two circular wheel slid-seals (the Case part) at the sides. A right depth fixed from

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**For a metal alloy it could be design in a special way using linear metal seals, fixed in the base of the mass, with various technique methods of oil feeding using the advantage of one way rotation of the wheels.**

A relation with rotating direction and existing of special small inclined trenches on the wheel surface in the right place (or on attached pin-mass unite) with automatic opening for oil inlet and outlet holes. This could apply with timing pins in the rotating parts. Using the advantage of one way rotation monitoring oil discharge from Case (or wheel side phase) starting before entrance of the seal and disposes while wheel rotates at a duration enough to lubricate attached zone particularly. This would be guarded with spring solid balls in specific place with each mass with a timing system controlled by edge of one side pad of each wheel, (or the wheel it self)

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**These seal masses are in three type of work.**

**No 2 for two sides anti-gas, a side for the charging air-fuel mixture although other side for gases of chamber after combustion, at place before the power stroke.**

No 3 for one way anti-gas of the combustion gases at place before exhaust opening.

**The radian distances between these seal are shown in ( Fig -10/25 )**

The size of any seal mass could be designed in order to allow a piston's maintenance preparation i.e. opening from the Case without open the engine Case regarding the simplicity of assembling the piston and push-arm device.

(Det- 19, Fig 4/25 & 5/25 & 10/25 & 20/25 )

9. The circular seal anti-gas (wheel-case, oil seals-slider) on the two side's edge of each wheel's circumference are (in various techniques). A suggestion of suitable two or three stainless steel blade rings mass fixed in special grooves in the wheel (or) with one set parts in Case and wheel to be interlock together when fixing the parts of the engine, using separated pair pieces fixed in Case, other ring fixed on operating wheel. The seals components would formed together a titling and a sliding device to protect the pads from any penetration of combustion gases (and maintaining the required locked chamber for mod of mixture). They could be lubricated with special holes in the right place where is no longer pressure on it, (i.e. end of exhaust opening) or using a self-lubrication.

**This depends on the expert industries laboratory (Det- 26, Fig 2/25 & 3/25).**

**10. The ordinary oil pump (and subsidiaries) , which fixed in the front of the engine (or else). Connected with the crank to transfer oil from lower store oil tank – that oil flow coming from Case-ended; to the upper(meddle) oil tank which discharges the intake of the main tunnel in the central crank; in which it has its winging (impeller) parts, in a shape that could direct the flow of oil sucking by tunnel's inlet holes in crank which suck it when rotates to discharge it**

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(Det- 20,21,22. Fig 4/25 & 7/25).

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The air-fuel mixture valve is to supply and charging the air-fuel mix to chamber. The pure-air valve is to supply the fast (pressured) to chamber for cooling and scavenging the after burn gases in chamber by pure air.

The two valves in each wheel charged consecutively with pressured air by one device to their two pipes from the same resource (pressured air cylinder or centrifugal turbine) which connected with engine rotation.

The principle of distributing the air between the two pipes for chambers i.e. the different angles (i.e. different timing), maintaining the required pressure for both air-fuel mixture and pure air (scavenging on chamber) at various speeds. The controlling requirement could be by using out let opening regulator of pressure release of main air supply (i.e. a reducing of that opening in higher speed mean more pressure to engine). Using a device before air enters the two pipes. The fuel would be splashed at required mixture or various rate (as required) to charge the pressured air directed to ignition with fuel in order to supply the chambers with the energy mixture before firing power stroke.

This could be done by a simple device of a needle valve(s) or simple sub carburettor or with additional mechanical or electrical computerised system as indirect injection (pre-mixing in feeding pipe or sub-store for each chamber).

12. The ball bearings fixed in engine Case for holding the Crank by connecting it with Case from two sides or more . (Det – 27 Fig 2/25 & 3/25).

13. Water pump as known in the front side of engine (or out of engine) with its outer radiator pipes, with Case water cooling system tunnels (canals) to cool returning hot oil and all Case. (Det – 23 Fig 2/25, 3/25) if required or using air cooling system instead of.

14. The exhaust opening in the Case for each wheel : starting with a small graded increasing opening in the direction of rotation in a special aerodynamic criteria then specific wings designed in the outlet of exhaust pipe in order to make the escaped gases at exhaust stroke take penetration position in a perfect way to produce a potential aerodynamic power reaction on the wheel to act on the same direction of rotation.

The principle used here is to use and reverse the flying principle which utilising the fast air produced by plane fan to produce fast air turbulence on the air-plane wings to fly. In this design an assumption of a fixed fan (the exhaust special

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The fuel spray injection instrument device to splash it in the compressed air using the simple natural spray principle of a liquid (i.e. acclimatisation )

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depending on volatile of the opening and the specific density of fuel. This is the indirect injection way of general charging of air while still in its way to chambers, maintaining idle (slow engine workability) by electric needle valves works with ignition by electric device. This could suit for any kinds of fuel. A mechanically or electrically device system, can be supplied as one unit for all engine chamber requirements since its one pressure control accelerator.

A separate pipe-opening regulator for each wheel unit fuel-mix valves requirement with a use of controlling system for automatic engine.(or using independent fuel injection on supplying pipe or store near each chamber valve)

(or using direct chamber fuel injection with its device for each wheel, fixed in the case ,as this could be more complicated device connecting the case).

The charging air could be pre-heated using device with electrical heater or utilising the exhaust emission heat by attached to exhaust gases pipes .

Fuel pipes and fuel pump & Charging (compressed) air pipes should bearing the max. required pressure for engine application with a safety factor .

( Fig 22/25 & 23/25 )

17. The compositions fixing-set up (assembling method) is starting with the crank mounting of all the wheels and pads to be pressed together as the required angles, placing the parts and fixing to the required circular seals on the wheels and trinket them in the grooves on two parts of Case then other accessories.

#### NOTES/

1. Since this is a new system, I tried to use a simple English language, with some data of the conventional systems components names, however these names (as specified) are not necessarily the standard names of parts in this system. These names may be changed in the development process according to the final proposals and their relevant industrial standard names, later...
2. All the discussions as for the enclosure drawings which are the references that declare all the compositions typically using Autocad computer programs drawings. (Drawings details are the liable references).
3. Enclosure the typical drawings set of 25 (twenty five) pieces.

Parameter	Unit	Value
Length	m	1.0
Width	m	0.5
Height	m	0.2
Volume	m <sup>3</sup>	0.1
Weight	kg	100
Mass	kg	100
Force	N	1000
Pressure	Pa	10000
Energy	J	100000
Power	W	1000000
Frequency	Hz	1000000000
Wavelength	m	0.0003
Speed	m/s	300000000
Acceleration	m/s <sup>2</sup>	9.81
Angular velocity	rad/s	1.57
Angular acceleration	rad/s <sup>2</sup>	1.57
Displacement	m	0.01
Velocity	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Force	N	0.01
Pressure	Pa	0.01
Energy	J	0.01
Power	W	0.01
Frequency	Hz	0.01
Wavelength	m	0.01
Speed	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Angular velocity	rad/s	0.01
Angular acceleration	rad/s <sup>2</sup>	0.01
Displacement	m	0.01
Velocity	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Force	N	0.01
Pressure	Pa	0.01
Energy	J	0.01
Power	W	0.01
Frequency	Hz	0.01
Wavelength	m	0.01
Speed	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Angular velocity	rad/s	0.01
Angular acceleration	rad/s <sup>2</sup>	0.01
Displacement	m	0.01
Velocity	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Force	N	0.01
Pressure	Pa	0.01
Energy	J	0.01
Power	W	0.01
Frequency	Hz	0.01
Wavelength	m	0.01
Speed	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Angular velocity	rad/s	0.01
Angular acceleration	rad/s <sup>2</sup>	0.01
Displacement	m	0.01
Velocity	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Force	N	0.01
Pressure	Pa	0.01
Energy	J	0.01
Power	W	0.01
Frequency	Hz	0.01
Wavelength	m	0.01
Speed	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Angular velocity	rad/s	0.01
Angular acceleration	rad/s <sup>2</sup>	0.01
Displacement	m	0.01
Velocity	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Force	N	0.01
Pressure	Pa	0.01
Energy	J	0.01
Power	W	0.01
Frequency	Hz	0.01
Wavelength	m	0.01
Speed	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Angular velocity	rad/s	0.01
Angular acceleration	rad/s <sup>2</sup>	0.01
Displacement	m	0.01
Velocity	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Force	N	0.01
Pressure	Pa	0.01
Energy	J	0.01
Power	W	0.01
Frequency	Hz	0.01
Wavelength	m	0.01
Speed	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Angular velocity	rad/s	0.01
Angular acceleration	rad/s <sup>2</sup>	0.01
Displacement	m	0.01
Velocity	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Force	N	0.01
Pressure	Pa	0.01
Energy	J	0.01
Power	W	0.01
Frequency	Hz	0.01
Wavelength	m	0.01
Speed	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Angular velocity	rad/s	0.01
Angular acceleration	rad/s <sup>2</sup>	0.01
Displacement	m	0.01
Velocity	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Force	N	0.01
Pressure	Pa	0.01
Energy	J	0.01
Power	W	0.01
Frequency	Hz	0.01
Wavelength	m	0.01
Speed	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Angular velocity	rad/s	0.01
Angular acceleration	rad/s <sup>2</sup>	0.01
Displacement	m	0.01
Velocity	m/s	0.01
Acceleration	m/s <sup>2</sup>	0.01
Force	N	0.01
Pressure	Pa</	

- The other advantage is to store some of it (the stress) to get use of it later (it will charge the piston elastic resistance) to use it in the same purpose i.e. transfers it later too positive reaction. The design will use the stand-still locket gases accrued due to fuel combustion against the piston (in chamber); in away using the stored energy again to use it in the same direction (this happen fast, increase in high speed). The very next situation where the pressured gases (as stored energy) start to penetrate and release free out (in exhaust stork), from the exhaust modified opening; the charged resistance add an extra power on penetrating gases as it starts returning to its first stag; a potential aerodynamic power exist by reversing this power with the elastic assistance of modified exhaust opening, (counter the theory of fly principle as aerodynamic reaction).







(counters to conventional system's principle-at high speed!); reduce vibrations of the main engine parts movements while increasing speed. The relation of push-arm depressing speed (time) with a rotation speed of the wheel in increasing engine's speed would lead to the equilibrium situation (as assumption) in very fast speed, it is a criteria of reducing chamber expanding combustion space for fuel at explosion; decreasing with speed increasing!

It is the miracle of the circular shape where the centrifugal powers exist in engine. This is a very important character and would be utilised for reducing fuel consumption while increasing speed, using computerised advanced accessories.

7. This engine system does not contains those valves that used in the old engine with their timing articulated connecting system, (camshaft, tapping springs....etc); that valves with its mechanism however will limit the high speed of the engine, which need complicated frictional slippers and accessories as timings systems, which may fail in high speed, as for the modern engines with more valves number for a piston. Those are not existing in this system i.e. delete their problems, noises and air smoke related with any of their defect, although delete their failure which may happen in high speed.
8. The fuel air mix can be controlled easily in this engine form out side accessories, in two ways by controlling the supplying pressure and also by controlling the fuel mixture, or both together, since the system doesn't required the same fuel compression ratio in all wheel chambers or in all its working situations with the independent characteristic of pistons performance and the independent units performance and the flexibility in the engine. Different types of fuel, any gasoline ( Benzene)octane with a regulator for fuel splash charger. Jet gasoline or (gas) can be easy used in this system after reconsidering the accessories.
9. Cooling and cleaning of the chambers by outside pressured air (scavenging) directly after hot gases exhausted (stroke). This will control the heat of piston capping and supply perfect adiabatic efficiency of air (heat loss) system for pistons in addition to the wheel side-walls oil cooling (enthalpy) of cylinder bore. The air also will prevent the remain of after burning carbon (soot) and will complete oxidise un-burned fuel and carbon oxide gas (CO) to complete oxidation it directly to (CO<sub>2</sub>), same for nitrite oxide (NO), and SO if exist, this is a very practical way in anti-pollution system's treatment, in away to help conserve the good environment and atmospheric ozone and to help prevent acid rain.

10. There is a new way of lubrication for the pistons that only the moving one will be lubricate when it needs to, as each piston has it's own oil pump, and the lubrication system in away that can reduce too much the pollution of air-oil smoke, since no crank case sump bellow the pistons, however no leakage gas affliction on oil sump if this happen.

11. The distribution of piston (cylinder) angles against the crank C. L. in the engine will not need a balance weight which existing in recent engine, and their metal bearing slipping pads on crank shaft for stress points lubrications to reduce friction on crank shaft which affected obviously in that system by high speed, those are not required in this engine system: The way of emission gases exhausted with the rotation direction will minimise the stress on seal mass, helping the good lubrication for seals.

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13. The best seen character for this engine is the multi-output powers which can be changed in various ranges not even depending on the rotation speed of the engine but on the working parts inside the engine (automatically power output).

Like for example all parts in used supplying 100% output of the engine for heavy work in a car engine, or 2/3 or less of parts in used for high speed or 1/3 or less of parts in used for just to keep the engine in Ideal working situation, this could be done in away that even its services (for un-used wheel); could be stopped.

This character is very useful: in fuel consumption, in reducing pollution, in long maintenance, this new engine can be produced as engine for every work (multi-purpose) in one equipment (i.e. one car) which is automatically control output as required, without affecting on un-used parts or makes tough vibration.

SHIRWO Automatical Need engine will be called Shirw a,n ... (SHIRWAN) system { automatical energy need}.

The transmission gear complex in this engine could be minimised.

14. Since there is the ability of stopping some of piston's movements (or all) in this design with the continue of rotation of the crank, the engine can be combined with an electric power engine in the same crank in an advanced design with a very practical use (fuel combustion engine and electric power engine in one unit set) depending on the simplicity design and minimum torque loss of this new engine which can charge the electric battery when the combustion engine working, and can use the electric power engine directly instead – if it needs; at required situations as needs in a crowded city, to reduce the pollution.
15. In addition to other characters and proposals which can be obtained in industrial laboratories this machine will fill the gap between the normal pistons combustion engine – and turbine Jet engine using their-all-good characteristics together in one engine, it will use the good characters of combustion piston (rotary) engine in economic fuel consumption, slow rotation speed if required, small engine and easy to manufacture and maintenance, with the Jet characteristics of high power, high rotation speed if required using the aerodynamic power of exhaust gas with other potential powers; in an advanced designed and cheap engine unit.
16. This design will open the wide gate for the computer participation in controlling all the activities and performance characteristics using advanced controller's accessories in this system at the near future. The speedy efficiency of the this

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more advanced research on it will continue, for an example the Laser ignition may be used in its ignition due to its high speed ....!

17. The fabrication of the extensive and various options of this engine design could be implied easily ,when the main elastic parts of this system could be used from those elastic devices springs or else used in the automatic emission re-fill weapon , the different machine-gun and fast-cannons ,i.e. those weapon industries could transfer a good part of their industries to participate in producing these engines for civil and peace purposes....!

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## ENGINE POWER OUTPUT TYPICAL PERFORMANCE

As for (drawing) Fig 19/25

1. The engine starts to rotate by a starter motor-accessory fixed near an end side of the engine, by a starter switch for few seconds.
2. All the inside parts will rotate, the valves start its work due to the automatic system of controlling its gate opening a giants each chamber in power unit wheels feeding the air-fuel mix, controlled by accelerator of driver pedal and its normal (idle) minimum working feeder; to the first chamber by opened the valve gate at the same time with the timing duration's of the cooling (lubrication) pads by its connected taping bar. The air fuel mix will enter the first chamber over the piston and the continuing of rotate will take this chamber filled with (compressed) air fuel mix in a place opposite the spark plug.

\*(as suction stork in old system) ...here {fuel charging zone}

3. The chamber will be filled with compressed air fuel mix that maintain in pressured situation since the chamber locked by Case wall and piston and gas mass seals from two sides in circular wheel surfaces back side Case wall.

The position of seal masses on wheel circumference will keep it locket.

When the chamber placed opposite to the spark plug, air-fuel mix instantaneously sparked by ignition timing distributor, and will explode to gases, due to fuel mix fast burning. A production gases which need to expand to their natural large volume, in closet space; causing high pressure power on surrounded walls and piston which has the flexibility of start moving depressing due to its special spring connector inside the cylinder base, causing stress on the spring in the best typical way, by power stress due to gasses to piston then depressing then charges energy to the spring (elastic) system.

\*(firing stroke)...old system.....starting power stroke.

{firing stroke} in this system .....start power zone

When the piston stress the spring system, the spring will transfer a part of this stress to the cylinder base (wheel side), causing rotation of the wheel, and the rest of that stress on spring will be stored as charged resistance assist to magnify the rotation power later at beginning of the exhaust graded opening to maximise the aerodynamic reaction on wheel rotation (this is the power duty of spring elastic power system here).



4. Apart of stress on the cylinder base caused by spring on side of wheel centre will push the wheel to rotate depending on this part of reaction of gasses pressure in the chamber due to pressured air-fuel mix fast burn, which will happen in other unit in succession.

\*(expansion power stroke).....with enthalpy (old system)

{expansion power stroke – 1<sup>st</sup> power zone}.....with enthalpy (Shirwo system)

Thus the firing stork will finished by burning all the mix then put off; producing potential stored energy (as gases in high pressure) before reaching the last big seal mass which fixed in suitable designed place.....criteria.

5. Due to the rotation of this (wheel), the chamber will reach the graded exhaust opening i.e. enlarging trench(s) with rotation direction, the already lifted gases which still in high pressure inside the chamber (as the piston in depressed position), new compound stresses in this place due to many potential powers take place.

\* (moving up starting – exhaust stroke-end power stroke) lose power ...with enthalpy  
{starting exhaust-return back release – 2<sup>nd</sup> power zone} extra power ...with enthalpy

6. The compound stresses that all react positively on wheel rotation are :

1<sup>st</sup> in time of gases start to penetrate from the graded exhaust opening – and due to star loosing of gases pressure in chamber the already compressed spring system (elastic system) which has been charged (or partial) by stored energy already produced in chamber before; will start rapidly to return to it's first position (normal situation) pushing the piston upward again, that will push also the remaining gases still not manage to penetrate to escape faster this case will cause potential reactions on the wheel the spring system in getting it first loosing situation will react in two direction i.e. on cylinder base means on the wheel when gases start escape.....(spherical reaction),

2<sup>nd</sup> the stored energy of spring (resistance) will attempt to be free causing power on gases (against piston) in chamber and due to circular Case back wall (chamber wall), and the uniform pressure gas physical character of chamber gas pad (still semi-locket chamber) that will counters the reaction; the potential resultant force will be the positive summation reacts of one direction on piston which is provide another additional power rotating the wheel in the same direction (spherical react).

3<sup>rd</sup> the locked pressured gases which start to penetrate when reach particular wide of exhaust graded opening will discharge fast cause Aerodynamic

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movement to put the chamber (i.e. cylinder i.e. wheel) in a place that all gases manage to escape faster which cause the wheel to get extra power for rotation by law of fast air principle (as the air plane flying principal put in reverses analysis)

- \* (upward dead point) reduce Enthalpy high degree Entropy with Body cooler only.  
{release total power} reduce Enthalpy low degree Entropy with Air scavenging & Body cooler (end of power zone).

And so in this place the stress summation will affect on the wheel and this a semi opened position i.e. the effecting of stress on the parts (near by) will be less since the explosion of the air fuel mix already finished before in a chamber alone far from valves.

Same operation will be happened with the nearest wheel chamber (by angle radian distance) consecutively and the rotation movement will continue.

7. When the gases manage to escape with the rotate of the wheel. The chamber will reach at the end of the exhaust opening to the pure compressed air valve which opens due to the rotation of the cooling pad tapping timing bar, against the chamber, permits a fast pure air cleaning (pure air scavenging) the chamber from what left to the gases to exit before the chamber leave the exhaust opening totally in ending the tacking cases due to the remaining carbon optical which may occur after burning the fuel mix and this way of cleaning the chamber by air has a great effect in deducing the pollution of un-oxidised hot gases. After fuel mix burning to treat them while still heat and will minimise the creation of carbon oxide gas element. The pressure of this pureed air will exceed with rotation speed increase. So the chamber will kept always in suitable temperature.

\* (move downward dead point-suction stroke) high d. Entropy ..lose power due to friction {natural stage – air cooling, cleaning} ...low d. Entropy ...no power lose !!

\* (move upward dead point-compression stroke) ...H.D. Entropy ...loss power.

End of power zone (shirwo engine)....lower entropy with air cooling, no power lose.

**An example of one power stroke in each half cycle (here) at each wheel bearing part (wheel zone!) on crankshaft.**

8. In increasing speed of this system, the radian rotation velocity of the wheel would become near to equalise with pistons push-arm (resistance) depression's velocity, depending on the elastic resistance (push-arm) data characteristic.



25.

(Fig21/25& 22/25),

- [illegible]



- D. The other accessories like oil pump and water pump and ignition distributor will rotate with the crank or as for the industrial design.

The overall work of power wheel units (all) output with a remarkable rotation speed or remarkable pressure for charging fuel will supply and monitoring the output power of the engine, that could be modified by various applications.

### **CONCLUSION :**

The maximum fuel power output that occur due to a larger piston moment on Crank, than that of recent system, with the effective angle of torque power more than 180 degree (depend on the design).

After the instance of fuel combustion in this mechanical design system, Physical power(s) will happen due to the particular distribution places of chambers with the utilisation of the physical character advantage of gas (under pressure chamber gases) that occurred after combustion, although utilise physical powers that happened in other particular places and situations.

1. Under pressure gases impact on piston, the physical power of elastic character (flexible push-arm), would act on two ways, a part pressing the wheel to rotate, and other on piston to get back to its top point (upward dead point), due to the resistance of push-arm that already depressed by the piston i.e. chamber's combustion gases. It is gas physical character in I locked space, which could reverses (reflect) any force as elastic resistance to an opposite reaction which will be back again on piston. Since the back side of chamber was the case wall (internal circumference of circular wheel cavity), which is the only sway moving smooth level with (constant fixed axes), chamber stills in locket situation by seals Job; while the wheel rotates means keeping locket chamber in fuel firing zone,. This is the appearance of hydraulic (spherical) reactions of chamber gases. There will be many advantages in utilising this chamber (gas pad) hydraulic characteristic in this mechanical system to invest all powers happen inside this system positively on engine Crank.
2. A losing of pressure due to gases penetration when gases start to penetrate due wheel rotate reach the exhaust opening, will agitate the last static elastic physical

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4. In increasing of engine speed (i.e. rotation speed) a new physical power will appear, instantaneously at the time of fuel combustion.

This with other criteria concerning the speed of push-arm depressing formula against the combustion force .A relation to wheel rotation speed which may reach theoretically an semi equilibrium situation in highly speed, between the reciprocated linear movement of pistons while increasing engine speed.

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An advanced computerised controlling system using the conclusion of that calculations for a piston weight, a wheel diameter, type of piston push-arm resistance, fuel output, kind of equipment, the load and speed; to set a controlling system for reducing the fuel by connecting it with the air-fuel charging accessories devices to control fuel as it required then reducing the consumption in increasing speed.

**IN GLOSSARY** (Philosophy of this technique):

Using the same theory for mechanical design but in a counter way of reaction. Since the liquid used in place here is that charged with power charged liquid (easy chemical energy analyses) that is fuel spray form Petrol. Which is been used in a discipline that could produce energy force inside this system then making this energy act in a way (i.e. reverse direction on that centrifugal pump system) to make it rotate as automotive power engine, while using the same



principle of reaction which is centrifugal (high speed reaction on a mass moving in a circular zone) to utilise this character on pistons-mass and assumed expanded gas mass) as for their particular circular-zone places in this system for producing torque power then could used in reducing the fuel needs for said speeds (that can be seen in high speed) while increasing speed!

The performance of the engine depends on many constant assumptions and the proposed observations of its work here without any mathematics figures since those information depend on the industrial specifications, laboratories calculations, kinds of allays, types of equipment, the capacity of output, fuel and accessories data.

For that reason the definitions are theoretically the principal of performance and could be practically proposed after monitoring the data in specialised industrial laboratories in order to reach the most economic design for each case and proposal.

**Note:**

Mathematical analyses might be done in specialised industrial laboratory at development process later using the recent requirement data available for proposals.

**SPECIFIC PROPOSALS:**

1. Light solid allows for power wheel unit might be reinforced by hard solid steel in torque stress places (i.e. middle panel of wheel, crank trunk hole between the cylinders, cylinder bases and wheel circumference as one alloy).
2. Light solid alloys for piston's disk as required.
3. The push-arm resistance capacity for piston must depend on type of: engine output, speed of acceleration, working output, type of design, dimensions...etc. The temperature resistance flexible metal spring system (i.e. that used in weapon industries as for automatic artillery gun refill spring) or : hydraulic closed system (gas, oil) with heat resistance seals may all used for piston elastic push-arm.
4. For main gas seal mass: a self-lubricated Graphite alloy or hard metal alloy with special lubrication system in the engine case using the advantage of one direction wheel rotation with special trenches and holes, or advanced plastic solid combined material with anti-heat character; the type, shapes and sizes

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## THE DRAWINGS CONTENTS

**Important note:**

**The drawing are assumed in typical (assumed) dimensions for A2 size drawings in Autocad diskette program to declare the composition of engine but not the same scale for A4 although not necessarily for industrial design requires.**

**FIG No (DWG No),**

- 1/25 (1) : GENERAL SHAPE**
- 2/25 (2) : TYPICAL POWER WHEEL UNITS IN ENGINE HORIZONTAL SEC.**
- 3/25 (3) : TYPICAL POWER WHEEL UNITS IN ENGINE VERTICAL SEC.**
- 4/25 (4) : TYPICAL SPRING MODIFIED CROSS SEC.**
- 5/25 (5) : TYPICAL THREE-POWER WHEEL UNITS SECTION PLAN**
- 6/25 (6) : TYPICAL POWER WHEEL UNIT OIL CANALS ANALYSIS**
- 7/25 (7) : TYPICAL COOLING, LUBRICATION PAD**
- 8/25 (8) : TYPICAL PISTON ANALYSIS**
- 9/25 (9) : TYPICAL ENGINE PARTS**
- 10/25 (10): TYPICAL DIMENSION OF POWER WHEEL UNIT**
- 11/25 (11): PISTON PUSH-ARM MODIFICATION**
- 12/25 (12): DUAL CONNECTED PUSH-ARM OF PISTON**
- 13/25 (13): VARIOUS PROPOSALS**
- 14/25 (14): VARIOUS CYLINDERS IN A WHEEL**
- 15/25 (15): VARIOUS PISTONS DIAMETERS ENGINE**
- 16/25 (16): VARIOUS WHEELS DIAMETRES ENGINE**
- 17/25 (17): FOUR-POWER WHEEL UNITS ENGINE**
- 18/25 (18): FORCES ANALYSIS**
- 19/25 (19): TYPICAL ENGINE PERFORMANCE**
- 20/25 (20): A PROPOSAL FOR SEAL-MASS DESIGN**
- 21/25 (21): TYPICAL ENGINE ACCESSORIES PROPOSAL 1**
- 22/25 (22): TYPICAL ENGINE ACCESSORIES PROPOSAL 2**
- 23/25 (23): A TYPICAL ENGINE FOR FLYING EQT- VERTICAL CRANK SHAFT**
- 24/25 (24): A TYPICAL ENGINE FOR A WIDE WHEEL**
- 25/25 (25): DETAILS OF ENGINE DRAWINGS**

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1. Chamber (combustion room).
2. Case (engine Chassis).
3. Wheel (Power wheel unite - energy unit).
4. Anti-scratched alloy (modified wheel surface).
5. Metal spring (straight or inclined).
6. Crank (power-torque crankshaft).
7. Piston push-arm (flexible shaft device).
8. Piston push-arm base. (cylinder base).
9. Spark plug.
10. Piston lubrication pump (built in, not as scale of drawing).
11. Oil tunnel (canal) for piston lubrication feeder.
12. Bolts for fixing seal base (in Case).
13. Pinion ring to transfer rotation to other device (for ignition...etc).
14. Solid steel ring for piston locks (in cylinder).
15. Canal in case for oil system (flow back).
16. Regulator adjustment for big seal mass.
17. Pad for cooling & lubrication.
18. Ring seals in piston.
19. Big seal mass in Case (anti-gas).
20. Air-fuel mixture-chargin's system (pre mixed fuel injection).
21. Pressured pure air (scavenging of chamber); charging's system.
22. Valve (one way- air check valve).
23. Canal of water's cooling system in Case.
24. Central oil's main supply canal.
25. Engine base flexible holder.
26. Big circular wheel oil seal, wheel slide-bearing (anti-gas, anti-oil).
27. Ball bearing device.
28. Oil pump (for engine).
29. Water pump.
30. Exhaust aerodynamic special opening.
31. Cladding perforated hollow pipe.

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- 32. Main assembling bolts for Case.
- 33. Ignition distributor.
- 34. Feeder oil tank for engine.
- 35. Oil sump.
- 36. Oil pump intake.
- 37. Oil supplies pipe.
- 38. Oil refill opening.
- 39. Oil lock washer.
- 40. Tightening ring (washer with pin).

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